◖◗   🔍 Search   🔔   🧑

OLTP vs OLAP

Suresh Podeti
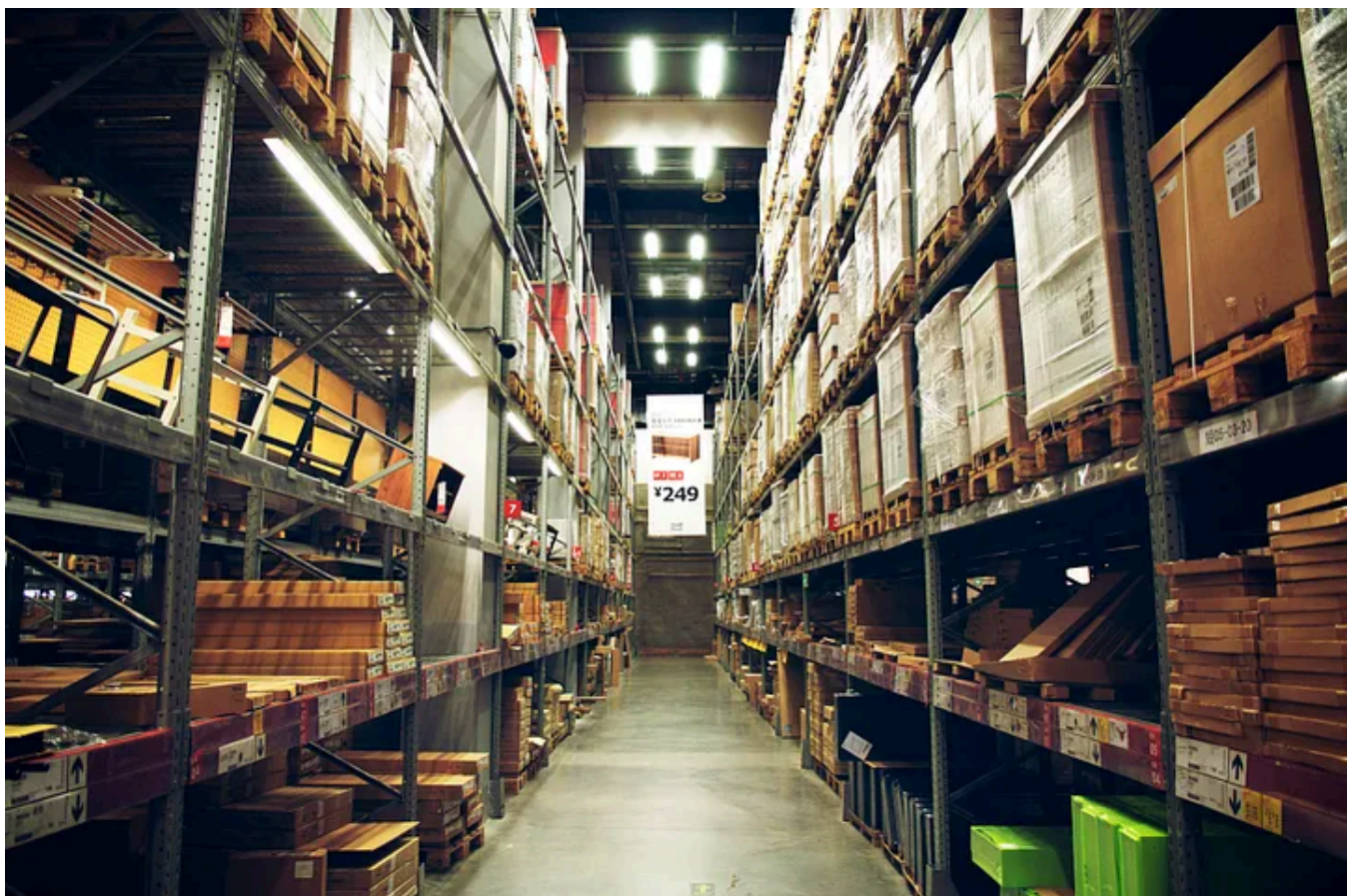
3 min read · May 17, 2023

▶ Listen   ⬆ Share   ••• More
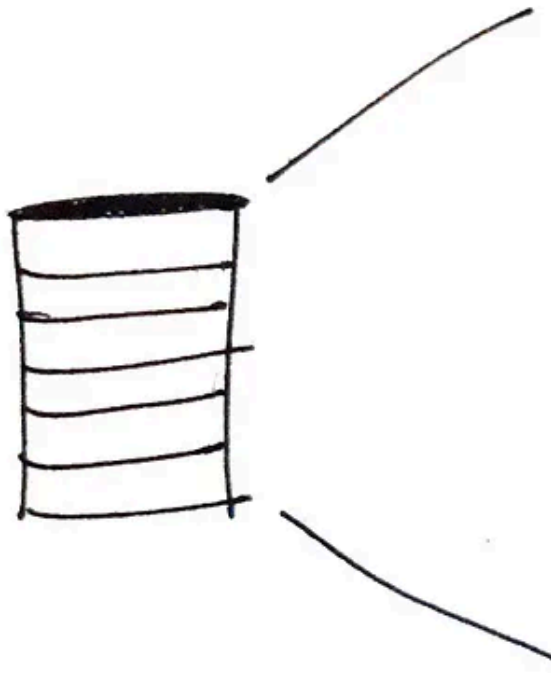

Photo by tommao wang on Unsplash

OLTP

OLTP, or **Online Transactional Processing,** systems handle a large number of transactions happening in real-time. But, what are the transactions?.

Well, **Transactions** are processes that occur in **their entirety** and in **isolation** from one another. They either **insert, update, or delete data** in a database. On successful execution, the changes made by a transaction to a database **persist** in the database

even in the event of a system failure. An application typically l**ooks up a small number of records by some key,** using an index.

The transactional data is stored in **Relational Databases** that ensure **ACID** properties for transactions. This data is written and queried at a very high pace to prevent any delay in processing.

OLTP governs transactions because they are the critical processes that we encounter in our everyday life. Online transactions, e-commerce orderings, online hotel bookings, atm transactions, etc. are all managed by OLTP processes.

Examples of OLTP

Imagine you log onto an e-commerce website to book the last pair of your favorite headphones which are currently on sale. Consider the following:

- Multiple people might be trying to book the headphones but none are aware of the processes of the others. (Isolation)

- The order will be considered successful only when the entire steps along with the payment are completed by any user. (Atomicity)

- Once the order is successfully completed by a user, it will be updated in the website database. The headphones will then become unavailable on the website. (Consistency)

- Now, even if the e-commerce website goes down due to a deluge of user traffic, the user still owns the headphone they bought successfully. (**D**urability)

P_ID	Transaction	Customer	Date
A212	A1123	C221	22/10/19
C211	A2017	A201	19/09/18
A103	E1113	A103	20/08/19

OLTP ensures that such transactions are carried out without any inconsistencies in the database with the help of the **ACID** (**Atomicity, Consistency, Isolation, Durability**) properties (that we just discussed).

OLAP

Databases also started being increasingly used for data analytics, which has **very different access patterns**. Usually an analytic **query needs to scan over a huge number or records**, only reading a few columns per record, and **calculates aggregate statistics** (such as count, sum, or average) rather than returning the raw data to the user. These queries are often written by business analysts, and **feed into reports** that help the management of a company make better decisions (**business intelligence**). This pattern is called **O**nline **a**nalytics **p**rocessing (OLAP)

What is same?

Both are **database management systems** for **storing** and **processing** data in large volumes. You can use them both to **query existing dat**a or **store new data.**

On the surface, both databases look similar because they **both have a SQL query interface.**

Some databases, such as **Microsoft SQL** server and **SAP HANA,** have support for both OLTP and OLAP in the same product.

What is different?

OLAP systems run analytics on a separate database called a **data warehouse.**

Dataset size

OLTP — Gigabytes to terabytes

OLAP — Terabytes to petabytes

Primarily used by

OLTP — Small number of records per query, fetched by key

OLAP — Aggregate over large number of records

Main read pattern

OLTP — Small number of records per query, fetched by key

OLAP — Aggregate over large number of records

Main write pattern

OLTP — Random access, low-latency writes from user input

OLAP — Bulk import (ETL) or event streams

Data representation

OLTP — Latest state of data (current point in time)

OLAP — History of events that happened over time

Data schema

OLTP — Entity / Relationships

OLAP — Star / Snowflake

References

1. https://www.analyticsvidhya.com/blog/2020/11/oltp-vs-olap/

Olap	Oltp	Data Ware Housing	Relational Databases	Sql

Written by Suresh Podeti

1.2K Followers

Aspiring Software Architect | SDE III (Golang) @JungleeGames| Ex-Byju's | Co-founder @Rupant Tech. | Ex-Synopsys | I.I.T Kharagpur | 7+ Years of Experience

Recommended from Medium